CLAIMS

1. A sensing apparatus comprising:

first and second members supported relative to each other by a support means;

the first member comprising a magnetic field generator for generating a magnetic field; and

the second member comprising an aerial for monitoring the magnetic field generated by the magnetic field generator,

wherein at least one of the first and second members is locally deformable relative to the other of the first and second members in order to vary the electromagnetic coupling between the magnetic field generator and the aerial so that, in response to a local deformation, a signal is induced in the aerial indicative of the position of the local deformation.

2. A sensing apparatus according to claim 1, wherein said aerial is a receive aerial, and wherein said magnetic field generator is a transmit aerial.

3. A sensing apparatus according to claim 1, wherein said aerial is a receive aerial, wherein the second member further comprises a transmit aerial defining a measurement path, and wherein the magnetic field generator is an intermediate coupler for electromagnetically coupling the transmit aerial and the receive aerial along the measurement path.

4. A sensing apparatus comprising:

first and second members supported relative to each other by support means, the first member comprising a transmit aerial and a receive aerial and the second member comprising an intermediate coupler which is

operable, in response to an excitation signal being applied to the transmit aerial, to generate a magnetic field in order to induce a sense signal in the receive aerial,

wherein at least one of the first and second members is locally deformable relative to the other of the first and second members in order to vary the electromagnetic coupling between at least one of i) the transmit aerial and the intermediate coupler, and ii) the intermediate coupler and the receive aerial so that, in response to a local deformation, a signal is induced in the receive aerial indicative of the position of the local deformation.

5. A sensing apparatus according to claim 3 or claim 4, wherein the transmit aerial comprises first and second excitation windings and the receive aerial comprises a sensor winding,

wherein the first and second excitation windings are electromagnetically coupled to the sensor winding via the intermediate coupler such that the electromagnetic coupling between the first and second excitation windings and the sensor winding varies in accordance with respective different functions along said measurement path.

6. A sensing apparatus according to claim 5, wherein the first and second excitation windings and the sensor winding are arranged so that said first and second functions vary sinusoidally with position with the same period but are out of phase with each other.

7. A sensing apparatus according to claim 6, wherein the first and second functions are one quarter of a cycle out of phase with each other.

8. A sensing apparatus according to any of claims 3 to 7, wherein the intermediate coupler comprises a resonant circuit.

9. A sensing apparatus according to claim 8, wherein the resonant circuit comprises at least one current loop which extends along the measurement path defined by the transmit aerial.

10. A sensing apparatus according to any of claims 3 to 9, wherein the transmit aerial and the receive aerial are positioned side by side, and wherein the intermediate coupler extends adjacent to the transmit aerial and the receive aerial.

11. A sensing apparatus according to claim 10, wherein the receive aerial comprises a sensor winding defining a first set of two or more loops, and wherein the intermediate coupler comprises a conductive winding having a portion adjacent the receive aerial defining a second set of two or more loops matching said first set of two or more loops.

12. An apparatus according to any of claims 2 to 11, wherein at least one of the transmit aerial and the receive aerial comprises a track of conductive ink.

13. A sensing apparatus according to any of claims 2 to 12, further comprising a signal generator operable to apply an excitation signal to the transmit aerial, and a signal processor operable to process said induced signal in the receive aerial to determine the position of the local deformation.

14. A sensing apparatus according to claim 13, wherein

the signal generator is operable to generate an excitation signal comprising a periodic carrier signal having a first frequency modulated by a periodic modulation signal having a second frequency, the first frequency being greater than the second frequency.

15. A sensing apparatus according to claim 14, wherein the signal processor comprises a demodulator operable to demodulate the induced signal generated in the receive aerial to obtain a demodulated signal at the second frequency.

16. A sensing apparatus according to claim 15, wherein the signal processor further comprises a phase detector operable to detect the phase of the demodulated signal at the second frequency.

17. A sensing apparatus according to claim 13, wherein the signal generator is operable to apply an excitation signal at a first frequency to the transmit aerial in order to induce a signal at the first frequency in the receive aerial, and the signal processor comprises a mixer operable to mix said induced signal at the first frequency with a reference signal at a second frequency, which is different from the first frequency, to generate a beat signal.

18. A sensing apparatus according to claim 17, wherein the signal processor comprises a phase detector for detecting the phase of the beat signal.

19. A sensing apparatus according to any of claims 2 to 18, wherein the transmit aerial defines a rectilinear measurement path.

20. A sensing apparatus according to any of claims 2 to 18, wherein the transmit aerial defines a measurement path which zig-zags across a measurement path.

21. A sensing apparatus according to any preceding claim, wherein the support means is arranged to support the first member relative to the second member in an undeformed state in which the magnetic field generator is operable to produce a magnetic field which induces a null signal in the aerial.

22. A sensing apparatus according to any preceding claim, wherein the support means supports the first member relative to the second member so that, in the absence of deformation, an air gap separates the magnetic field generator and the aerial.

23. A sensing apparatus according to any of claims 1 to 21, wherein the support means comprises a deformable material separating the magnetic field generator and the aerial.

24. A sensing apparatus according to any preceding claim, wherein one of the first and second members comprises a substrate and the other of the first and second members comprises a membrane,

wherein the support means supports at least part of the membrane away from the surface of the substrate in the absence of deformation.

25. A sensing apparatus according to claim 24, wherein the membrane comprises ridge means defining a portion of the membrane which, in the absence of deformation, is substantially within a plane parallel with the surface of the substrate.

26. A sensing apparatus according to claim 24, wherein the membrane is separated from the substrate by a layer of flexible material so that the membrane is deformable in a direction toward the surface of the substrate.

27. A sensing apparatus according to claim 26, wherein the flexible material is resiliently deformable.

28. A sensing apparatus according to any preceding claim, wherein at least one of the first and second members comprises index markings associating different positions with respective information.

29. A man-machine interface comprising a sensing apparatus as claimed in any preceding claims.